The structure of Podocarpus spinulosa.—BROOKS and STILES[11] find the structure of the stem and leaf of *Podocarpus spinulosa* similar to species studied by PENHALLOW and WORSDELL. The wall of the microsporangium is described as similar to that of *Saxegothaea* and *Araucaria* except that the dehiscence is oblique. The male gametophyte agrees with *P. ferruginea* and *P. dacrydioides*, described by JEFFREY and CHRYSLER, having a prothallial complex of eight cells, and occasionally the appearance as of a second derivative of the generative cell. The course of the vascular bundles in the ovulate sporophyll is studied in detail and compared with other forms.

That *Podocarpus* is a specialized offshoot from *Saxegothaea*-like ancestors is confirmed by the presence of less mesarch wood than in *Saxegothaea*, the loss of function of some of the resin canals, and the specialized ovulate structure with reduction in size and number of scales. The independence of the vascular supply of the ovule from that of the scale is explained by the greater importance of the ovule in *Podocarpus*. The authors regard Podocarpineae as a natural group, with no very definite connection with Taxineae, no evident relation to Abietineae, but with a probable connection with Araucarineae.—MARY S. YOUNG.

Evolution of plants.—In his presidential address of 1910 before the Linnean Society of London, PROFESSOR SCOTT selected as his subject "Some modern ideas on the course of evolution of plants." It is an outline of the present status of opinion in reference to the evolution of vascular plants, especially as developed by the recent rapid increase of knowledge of paleobotanical material, and is in part a confession of faith. The author evidently believes in the homologous origin of the alternation of generations, and regards the sporophyte of the pteridophyte as developed directly from the thallophyte body. Special attention is given to the views of LIGNIER in connection with this thalloid origin of the cormophyte. The classification of vascular plants proposed in the new edition of his *Studies in fossil botany* is outlined, and the gymnosperm relationships are discussed; while Bennettitales-like forms are still put forward as representing a possible origin of the angiosperms. Perhaps the main thesis of the address is to illustrate among plants the theory of GASKELL, developed in a discussion of the origin of vertebrates, that "each successive group has arisen from some member of the highest group existing at the time."—J. M. C.

Evolution of Pinus.—BAILEY[12] has presented the anatomical characters that seem to be of service in tracing the lines of descent of pines. The cretaceous pines and *Prepinus* are characterized by thick-walled ray parenchyma, "piciform" lateral ray pits, absence of marginal ray tracheids, and abundant

[11] BROOKS, M. A., and STILES, W., The structure of *Podocarp spinulosa*. Annals of Botany **24**:305–318. *pl. 21*. 1910.

[12] BAILEY, IRVING W., Anatomical characters in the evolution of *Pinus*. Amer. Nat. **44**:284–293. 1910.

tangential pitting of autumnal tracheids. The change in the living pines is seen in the disappearance of thick-walled ray cells, the presence of large compound ray pits, the development of ray tracheids, and the loss of tangential pitting of autumnal tracheids. The type of hard pines represented by *P. resinosa* in North America and *P. silvestris* in Europe is "the most highly developed and specialized condition among living pines." The nut pines (of North America and Asia) have piciform lateral ray pits and thick-walled ray cells, and in these features they are the living pines that approach most nearly to the cretaceous pines. The hard pines of the United States, with the exception of *P. resinosa*, show a great range of variation from piciform to compound lateral ray pits; and the soft pines present a parallel series of gradations.—J. M. C.

Non-available water.—BOVIE[13] has tested the effect of salts upon the non-available water in a soil of crushed quartz. Aside from a full nutrient solution of 0.2 per cent, various amounts of NaCl, ranging from 0.05 to 0.6 per cent, were added. To 100 grams of soil 20 grams of solutions were added. After the plants had grown considerably and the soil moisture was nearly exhausted, the cultures were placed in a special drying chamber of relative humidity of 0.1. Soil was tested for contained moisture when the foliage began to wilt, and when it showed drying. The remaining water was essentially the same regardless of the amount of salt present. Assuming that none of the salts are absorbed by the plants, BOVIE finds that the soil water, at the close of the experiments, in some cases would contain more than 300 per cent of salts, and that much of it must be in the solid form in spite of greatly increased solubility in the thin water films. He also offers some evidence for the movement of water in soils of low water content in the form of vapor, a thing already emphasized by various workers.—WILLIAM CROCKER.

Transpiration stream.—ZIJLSTRA[14] finds that lowering the temperature of sections (20 cm. in length) of stem of intact plants to 0° C. for several days, even under the most favorable conditions for transpiration, does not lead to wilting of the foliage. It is assumed that this renders the living cells of the zone comparatively inactive, without injuring them and without producing injurious or blocking material. The results are contrary to those obtained by the same method by URSPRUNG, who used the results as an argument for the necessity of the activity of living cells to the continuity of the transpiration stream. ZIJLSTRA also conducted a number of experiments on the movement of 0.1 per cent *Säureviolett* (GRÜBLER) in living and dead stems. He also

[13] BOVIE, WILLIAM T., The effects of adding salts to the soil on the amount of non-available water. Bull. Torr. Bot. Club **37**:273–292. 1910.

[14] ZIJLSTRA, K., Contributions to the knowledge of the movement of water in plants. Reprint from Koninklijke Akad. Wetenschappen te Amsterdam. 1910:574–584.